

REMARKS

Claims 11, 14, 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terada, *et al.* (U.S. Patent Number 6,124,888) in view of Hosier, *et al.* (U.S. Patent Number 6,683,646). Claims 12, 13, 15, 17, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terada, *et al.* in view of Hosier, *et al.* and further in view of Roberts (U.S. Patent Number 5,541,654).

In the present invention of claims 11-20, during a high speed image pickup, a first horizontal line is enabled, outputting a charge signal of the first horizontal line by a vertical transmission signal, and a vertical erasure signal is then applied, erasing the charge signal of the first horizontal line. A second horizontal line is then enabled. The vertical erasure signal is applied for a second time, erasing the charge signal of the second horizontal line. A horizontal line following the first horizontal line is then enabled, and the vertical transmission signal is applied for a second time, outputting a charge signal of the horizontal line following the first horizontal line. Thus, the vertical erasure signal is applied for the second time, erasing the charge signal of the second horizontal line before the vertical transmission signal is applied for the second time, reducing the amount of time for which charges are accumulated.

Terada, *et al.* discloses an image pickup apparatus in which certain horizontal lines are skipped. In the image pickup apparatus all pixels of a selected horizontal line are read out. In a horizontal blanking period (HBL) after completion of the reading out of the pixels in the selected horizontal line, a gate potential of the pixels is brought to a reset potential, and the charge of all the pixels of the selected horizontal line are discharged. Also, in this same timing, an overflow potential VOF is applied to a non-selected line for discharging surplus charge of all pixels of the non-selected line. Following the reset operation, a vertical selection pulse is sent sequentially to the upper direction by the vertical driving pulses, and repeatedly carries out the horizontal scanning operation in repetition (See Terada, *et al.*, column 13, lines 26-60). Terada, *et al.* is cited in the Office Action as not disclosing the charge of the skipped line is erased.

Hosier, *et al.* is cited in the Office Action as teaching that photodiodes are constantly

outputting charge as long as light is impinging on the photodiodes resulting in the spread of excess charge caused by the exposure of light leaking from one photodiode to another.

Terada, *et al.* discloses the overflow potential VOF is applied to the non-selected line for discharging surplus charge of all the pixels of the non-selected line, thus discharging the excess charge disclosed in Hosier, *et al.* That is, Terada, *et al.* explicitly teaches an approach to discharge the excess charge that does not teach or suggest the approach claimed by the applicants, namely, applying a vertical erasure signal for a second time. Because of this explicit teaching of Terada, *et al.*, the applicants respectfully submit that one of skill in the art would not be motivated to modify the teaching of Terada, *et al.* to remove the excess charge by applying a vertical erasure signal for a second time, as claimed by the applicants. Therefore, the applicants respectfully submit that it would not be obvious to a person of skill in the art to apply a vertical erasure signal for a second time erasing a charge signal of a second horizontal line before a vertical transmission signal is applied for a second time.

Further, Terada, *et al.* fails to teach or suggest that a vertical erasure signal is applied for a second time, erasing a charge signal of a second horizontal line before a vertical transmission signal is applied for a second time, thereby reducing an amount of time for which charges are accumulated, as not set forth in the amended claims. Instead, in Terada, *et al.*, the overflow potential VOF is applied to the non-selected line for discharging surplus charge of all pixels of the non-selected line at the same time as the gate potential of the pixels of the selected line is brought to the reset potential. In the present invention as claimed in amended claims 11-20, a time for which charges are accumulated in a plurality of pixels is reduced because the vertical erasure signal is applied for a second time. Terada, *et al.* can not reduce the time for which charges are accumulated in the pixels of the selected line because the excess charge of the pixels in the non-selected line are discharged at the same time as the gate potential of the pixels of the selected line are reset. Therefore, the amount of time for which the pixels of the selected line are charged is not reduced by erasing a charge signal of a second horizontal line before a vertical transmission signal is applied for a second time.

Hosier, *et al.* also fails to teach or suggest that a vertical erasure signal is applied for a second time, erasing a charge signal of a second horizontal line before a vertical transmission signal is applied for a second time, reducing an amount of time for which charges are accumulated, as set forth in the amended claims.

Hence, neither of Terada, *et al.* and Hosier, *et al.* teaches or suggests certain elements of the present invention set forth in amended claims 11-20. Specifically, neither of the references teaches or suggests that a vertical erasure signal is applied for a second time, erasing a charge signal of a second horizontal line before a vertical transmission signal is applied for a second time, reducing an amount of time for which charges are accumulated, as set forth in the amended claims. Accordingly, there is no combination of the references which would provide such teaching or suggestion. Neither of the references, taken alone or in combination, teaches or suggests the invention set forth in the amended claims 11-20. Therefore, it is believed that the amended claims 11-20 are allowable over the cited references, and reconsideration of the rejections of claims 11, 14, 16 and 19 under 35 U.S.C. § 103(a) based on Terada, *et al.* and Hosier, *et al.* is respectfully requested.

Roberts discloses an imaging device with random access architecture. A capacitor 44 is charged, output, and then reset in preparation for another interval of time integration storing charge on the capacitor 44 (see Roberts, column 8, lines 26-45). Thus, the charge is reset after the charge has been output.

Therefore, Roberts also fails to teach or suggest that a vertical erasure signal is applied for a second time, erasing a charge signal of a second horizontal line before a vertical transmission signal is applied for a second time, reducing an amount of time for which charges are accumulated, as set forth in the amended claims. Instead, in Roberts, the charge in the capacitor is transmitted before it is reset.

Hence, none of Terada, *et al.*, Hosier, *et al.* and Roberts teaches or suggests certain elements of the present invention set forth in amended claims 11-20. Specifically, none of the references teaches or suggests that a vertical erasure signal is applied for a second time, erasing a


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charge signal of a second horizontal line before a vertical transmission signal is applied for a second time, reducing an amount of time for which charges are accumulated, as set forth in the amended claims. Accordingly, there is no combination of the references which would provide such teaching or suggestion. None of the references, taken alone or in combination, teaches or suggests the invention set forth in the amended claims 11-20. Therefore, it is believed that the amended claims 11-20 are allowable over the cited references, and reconsideration of the rejections of claims 12, 13, 15, 17, 18 and 20 under 35 U.S.C. § 103(a) based on Terada, *et al.*, Hosier, *et al.* and Roberts is respectfully requested.

In view of the amendments to the claims and the foregoing remarks, it is believed that, upon entry of this Amendment, all claims pending in the application will be in condition for allowance. Therefore, it is requested that this Amendment be entered and that the case be allowed and passed to issue. If a telephone conference will expedite prosecution of the application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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